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$$=\frac{9(3729-2624\sqrt{2})a^2}{25(3\pi-28+16\sqrt{2})^2}=\left(\frac{3}{5}\frac{a}{}\right)^2\left(\frac{32\sqrt{2}-41}{3\pi-28+16\sqrt{2}}\right)^2=\tfrac{2}{5}a^2, \text{ nearly,}$$

PROBLEMS FOR SOLUTION.

ALGEBRA.

187. Proposed by L. E. DICKSON, Ph. D., Assistant Professor of Mathematics, The University of Chicago.

Express by radicals the roots of $x^7+px^5+\frac{2}{7}p^2x^3+\frac{1}{45}p^3x+r=0$.

188. Proposed by GUY SCHUYLER.

$xy+ab=2ax$, $x^2y^2+a^2b^2=2b^2y^2$

GEOMETRY.

209. Proposed by W. J. GREENSTREET, A. M., Editor of The Mathematical Gazette, Stroud, England.

Find by a geometrical method the maximum value of $\sin\theta\cos\theta\cos2\theta$.

210. Proposed by L. E. DICKSON, Ph. D., Assistant Professor of Mathematics, The University of Chicago.

Let ADC be a triangle with angle $C=120°$, and let the interior bisector of angle C meet AD in B. Prove that $2.CB$ is the harmonic mean between CA and CD.

211. Proposed by L. E. DICKSON, Ph. D., Assistant Professor of Mathematics, The University of Chicago.

Prove the validity of the following construction of an inscribed regular pentagon and regular decagon: Draw any two perpendicular radii of the given circle with center C. Call E the end of one radius CE and M the middle point of the perpendicular radius CM. Take the point R on CM produced through C such that $RCM=EM$. Then RC=side of inscribed regular decagon, RE=side of inscribed regular pentagon.

CALCULUS.

172. Proposed by F. P. MATZ, Sc. D., Ph. D., Professor of Mathematics and Astronomy in Defiance College, Defiance, O.

$$\text{Solve } x\frac{dy}{dx}=\frac{y}{y^{-1}-\log x}.$$

DIOPHANTINE ANALYSIS.

119. Proposed by L. E. DICKSON, Ph. D., Assistant Professor of Mathematics, The University of Chicago.

If p be any prime number and n any positive integer, the congruence